PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-3

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2012 Fisheries Management Survey Report

Striker Reservoir

Prepared by:

Dan Ashe, Assistant District Management Supervisor
and
Todd Driscoll, District Management Supervisor

Inland Fisheries Division
District 3D, Brookeland, Texas

Carter Smith
Executive Director

Gary Saul
Director, Inland Fisheries

July 31, 2013

TABLE OF CONTENTS

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Striker Reservoir were surveyed in 2012 using electrofishing and trap netting and in 2013 using gill netting. Historical data are presented with the 2012-2013 data for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Striker Reservoir is an impoundment of Striker Creek, a tributary of the Angelina River in the Neches River Basin. The Angelina-Nacogdoches County Water Control and Improvement District is the controlling authority. Primary uses are flood control, condenser cooling for a steam-electric generating plant, and recreation. This reservoir has a surface area of 1,920 acres at conservation pool (292 feet msl), a shoreline length of 13.7 miles, and an average depth of 15 feet. Water level fluctuations average 1-3 feet annually. One public boat ramp is available and bank access is adequate.

- **Management History:** Important sport fish include catfish, black bass, crappie, and White Bass. The management plan from the 2008 survey report included stocking Blue Catfish at 50 fish/acre in 2009 and 2010. Striker Reservoir has limited habitat which has resulted in reduced fish recruitment and angler catch. In 2010, brush piles were introduced to improve angler catch. Additionally, recommendations were made to increase habitat by conducting periodic water draw downs (3-5 feet) to allow inundation of terrestrial vegetation at conservation pool.

- **Fish Community**
  - **Prey species:** Historically, prey abundance has been relatively low. In 2012, Threadfin Shad and Gizzard Shad were most abundant, and most Gizzard Shad were available as prey. Total electrofishing catch of sunfish (Warmouth, Bluegill, Longear Sunfish, and Redear Sunfish) was low.

  - **Catfishes:** The Channel Catfish population declined since the previous gill net survey conducted in 2009. However, most fish were legal-size. No Blue Catfish were collected during the 2013 gill net survey despite stockings in 2009 and 2010.

  - **White Bass:** White Bass were present in limited abundance. Lack of sufficient prey may be reducing survival.

  - **Black basses:** Historically, Spotted Bass have been the most abundant. In 2012, electrofishing catch of Spotted Bass and Largemouth Bass were similar and had increased from previous surveys. Both populations are characterized by smaller individuals and fish condition was adequate.

  - **Crappies:** Only White Crappie were sampled in 2012-2013. White Crappie trap net catch was relatively high in 2008 but declined in 2012. Black Crappie were collected in 2003 and 2008.

- **Management Strategies:** Continue to manage all sport fish with statewide regulations. Deploy brushpile fish attractors throughout the reservoir. Recommend periodic water drawdowns to increase littoral habitat. Conduct standard monitoring surveys with trap nets, gill nets, and electrofishing surveys in 2016-2017. Access and vegetation surveys will be conducted in 2016-2017.

INTRODUCTION

This document is a summary of fisheries data collected from Striker Reservoir in 2012-2013. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2012-2013 data for comparison.

Reservoir Description

Striker Reservoir is a 1,920-acre impoundment constructed in 1957 on Striker Creek (Table 1). It is located in Rusk County approximately 30 miles northwest of Nacogdoches and is operated and controlled by the Angelina-Nacogdoches County Water Control and Improvement District. Primary water uses include flood control, condenser cooling for a steam-electric generating plant, and recreation. Secchi disc readings average 2.5 feet. Water fluctuations average 1-3 feet annually (Figure 1). Habitat at time of sampling consisted of standing timber, boat docks, riprap, and limited aquatic vegetation. The majority of the land surrounding the reservoir is used for agriculture, timber production, and residential development.

Angler Access

Striker Reservoir has one boat ramp at Lake Striker Marina, which was dredged and extended during low water levels in 2012. Additional boat ramp characteristics are in Table 2. Shoreline access is limited to the boat ramp area and the fishing dock located at Lake Striker Marina.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Ashe and Driscoll 2009) included:

1. Stock Blue Catfish in 2009 and 2010 at a rate of 50 fish/acre. Monitor with standard gill net surveys in 2013 to evaluate the success of the stocking.
   Action: Blue Catfish were stocked in 2009 and 2010 at a rate of 50 fish/acre. A standard gill net survey was conducted in February 2013 and no Blue Catfish were collected.
2. Coordinate and advise the controlling authority to introduce brush piles to increase angler catch efficiency and also to consider water drawdowns to allow semi-terrestrial vegetation to become established.
   Action: In coordination with the controlling authority and the Lake Striker Homeowner Association, brush piles were introduced into the reservoir in 2010. Aquatic vegetation was introduced in 2009 and again in 2012. However, none of the introduced vegetation survived. The controlling authority was advised regarding potential benefits of drawdowns but no action has been taken.

Harvest regulation history: Sport fishes in Striker Reservoir are currently managed with statewide regulations (Table 3). From 1994 to 1998, Largemouth Bass were managed with a 14- to 18-inch slot-length limit in an attempt to reduce the number of smaller fish and provide protection for larger fish. The slot limit was evaluated and the population structure had not improved, so statewide regulations were implemented.

Stocking history: Florida Largemouth Bass fingerlings were stocked in 1976, 1995, and 1997 (440,186 total) (Table 4). Palmetto Bass were stocked in 1998 and 1999 (73,238 total). Threadfin Shad were successfully introduced in 1974 and 1976. Blue Catfish were most recently stocked in 2009 and 2010 (191,690 total).

Vegetation/habitat management history: Striker Reservoir aquatic vegetation coverage is limited (Table 6). The feasibility of conducting a fertilization program was assessed in 2006, but related costs

and the amount of fertilizer needed were impractical. Aquatic vegetation introductions in 2009 and 2012 (primarily water willow) were unsuccessful. In coordination with the controlling authority and the Lake Striker Homeowner Association, brush piles have been introduced on several occasions to increase habitat and angler catch. As part of research exploring brushpile size and configuration, over 200 cedar trees were deployed in 2011.

Water transfer: The controlling authority, the Angelina and Nacogdoches Water Control and Improvement District No. 1, sells water for industrial use to Luminant Energy, which operates a power plant on the western shore of the reservoir. The controlling authority also provides cooling water for Southern Company's biomass fired power plant in Sacul, which is about 10 miles southeast of the reservoir. The City of Henderson also has an option for future water use.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and for gill and trap nets as the number of fish per net night (fish/nn). All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), terminology modified by Guy et al. 2007], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996).

Index of Vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics.

Source for water level data was from the Angelina and Nacogdoches Counties Water Control and Improvement District No. 1.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of standing timber and boat docks (Table 5). Aquatic vegetation coverage was <10% of the reservoir surface area (Table 6). Aquatic vegetation (primarily water willow) was introduced in 2009 and 2012 but none of the plantings survived.

Prey species: Historically, prey abundance has been relatively low. Electrofishing catch rate of Threadfin Shad was 161.0/h in 2012 (Appendix A), which is considerably higher than observed in 2003 (7.0/h) and 2008 (24.0/h). The abundance of Gizzard Shad available as prey increased in 2012 (IOV=74) (Figure 2). Bluegill was the most abundant sunfish species but catch rates were low in 2008 (38.0/h) and 2012 (37.0/h) (Figure 3). Other species available as prey included Longear and Redear sunfish.

Channel catfish: In 2013, the gill net catch rate of Channel Catfish was 4.6/nn, a decline from 2004 (8.8/nn) and 2009 (9.4/nn) surveys (Figure 4). Body condition was moderate with most W_r values exceeding 80.

White bass: White Bass were present in the reservoir, but their population density remained low. The catch rate in 2013 was the same as observed in 2009 (0.8/nn) and was less than observed in 2004 (3.0/nn) (Figure 5).

Black bass: Black bass abundance appears to be increasing. Catch rates of Spotted Bass in 2013 (127.0/h) increased since the previous two surveys in 2003 (66.0/h) and 2008 (53.0/h) (Figure 6).

Largemouth Bass relative abundance has increased over the last three survey periods to 117.0/h in 2012 (Figure 7). Most of the catch was comprised of fish <8 inches in length. Inundated terrestrial vegetation that developed during low water in 2011 increased littoral cover and likely increased black bass recruitment rates.

White crappie: Only White Crappie were collected from the 2012 trap netting survey (Figure 8), but Black Crappie were collected in 2003 and 2008. In 2012, the catch rate for White Crappie (1.2/nn) was lower than that observed in 2008 (15.4/nn).

Fisheries management plan for Striker Reservoir, Texas

Prepared – July 2013.

ISSUE 1: Habitat is limited, which reduces fish recruitment and angler catch. In addition, low primary production reduces Threadfin Shad and sunfish abundance, which limits prey for sport fish. The feasibility of fertilization was explored in 2006 but deemed impractical due to cost and the amount of fertilizer needed.

MANAGEMENT STRATEGIES

1. In coordination with the controlling authority, place brush piles throughout the reservoir to provide habitat and increase angler catch efficiency.
2. Continue to recommend periodic drawdowns (3-5 feet) to increase littoral habitat (i.e., inundated terrestrial growth).

ISSUE 2: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Giant salvinia and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Contact and educate marina owners about invasive species, and provide them with posters, literature, etc… so that they can in turn educate their customers.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes standard trap netting, gill netting, fall electrofishing, and access and vegetation surveying in 2016-2017 (Table 7).

LITERATURE CITED

Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Ashe, D., and T. Driscoll. 2009. Statewide freshwater fisheries monitoring and management program survey report for Striker Reservoir, 2008. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-33, Austin.

DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.

Guy, C. S., R. M. Neuman, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32(7): 348.

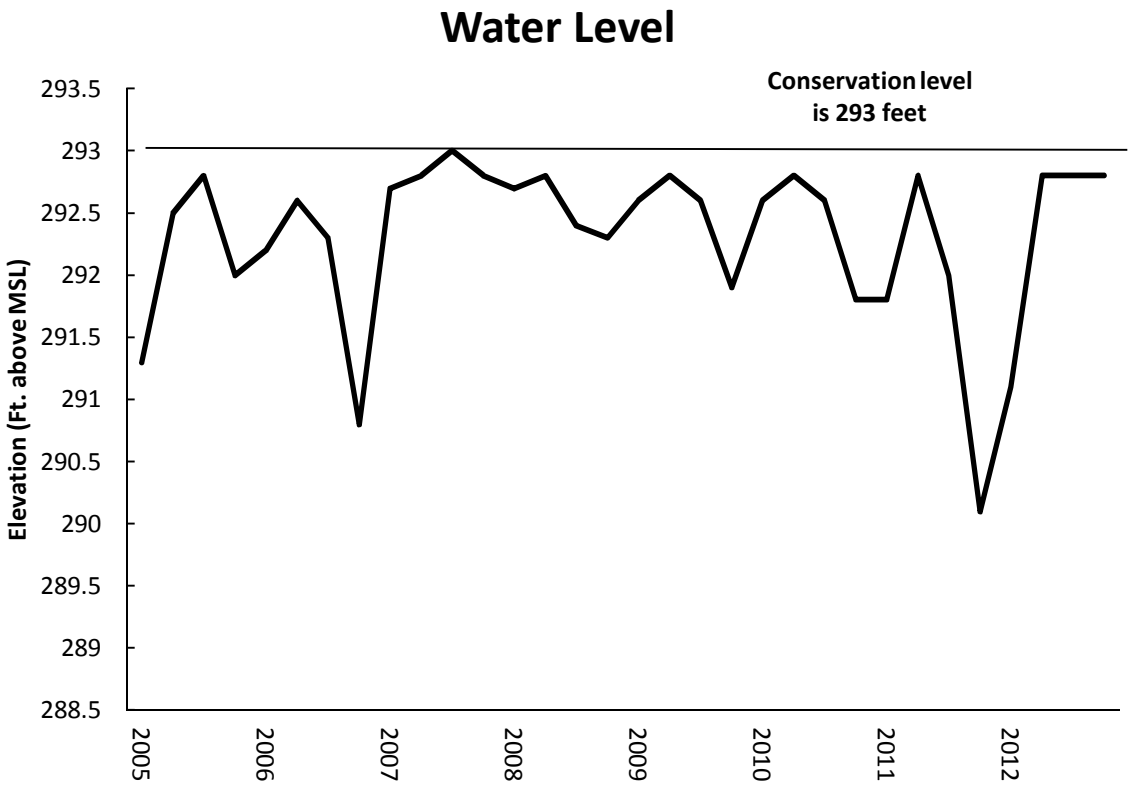


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Striker Reservoir, Texas.

Table 1. Characteristics of Striker Reservoir, Texas.

Characteristic	Description
Year constructed	1957
Controlling authority	Angelina and Nacogdoches Counties Water Control and Improvement District
County	Rusk
Reservoir type	Secondary Stream
Shoreline Development Index (SDI)	2.2
Mean depth	15 feet
Size	1,920 acres
Secchi disc	1-3 feet
Conductivity	200 umhos/cm

Table 2. Boat ramp characteristics for Striker Reservoir, Texas, October 2012. Reservoir elevation at time of survey was 292.8 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Lake Striker Marina	31.940984 -94.975349	Y	30	290	Condition is good with boat dock present

Table 3. Harvest regulations for Striker Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth	5[a]	14–inch minimum
Bass, Spotted	5[a]	None
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

[a]Daily bag for largemouth and spotted bass = 5 fish in any combination.

Table 4. Stocking history of Striker Reservoir, Texas. FGL = fingerling; AFGL = advanced fingerling; ADL = adult; UNK = unknown.

Species	Year	Number	Life Stage	Mean TL (in)
Blue Catfish	2009	95,936	FGL	2.0
	2010	95,754	FGL	2.0
	Total	191,690		
Channel Catfish	1973	5,000	AFGL	7.9
	Total	5,000		
Florida Largemouth Bass	1976	200,000	FRY	1.0
	1995	120,000	FRY	0.9
	1997	120,186	FGL	1.2
	Total	440,186		
Palmetto Bass (striped X white bass hybrid)	1979	80,000	UNK	UNK
	1998	49,023	FGL	1.3
	1999	24,215	FGL	1.5
	Total	153,238		
Red Drum	1975	18,435	UNK	UNK
	Total	18,435		
Threadfin Shad	1974	15,000	ADL	2.9
	1976	30,000	ADL	2.9
	Total	45,000		

Table 5. Survey of structural habitat types, Striker Reservoir, Texas, 2008. Shoreline habitat type units are in miles and standing timber is acres.

Habitat type	Estimate	% of total
Rocky shoreline	1.1 miles	7.7
Boat docks	3.1 miles	22.7
Natural shoreline	3.6 miles	26.5
Standing timber	972.0 acres	49.5

Table 6. Survey of aquatic vegetation, Striker Reservoir, Texas, 2003, 2008, and 2012. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2003	2008	2012
Southern naiad			95.0 (4.9)
Spadderdock			20.0 (1.0)
Yellow water lily	15.5 (0.8)	21.0 (1.1)	42.0 (2.2)
Barnyard grass		3.5 (0.1)	
Common reed	10 (0.5)		21.0 (1.1)
Cattail		1.5 (0.1)	
Coontail	Trace		
Hydrilla	Trace	Trace	

Gizzard Shad

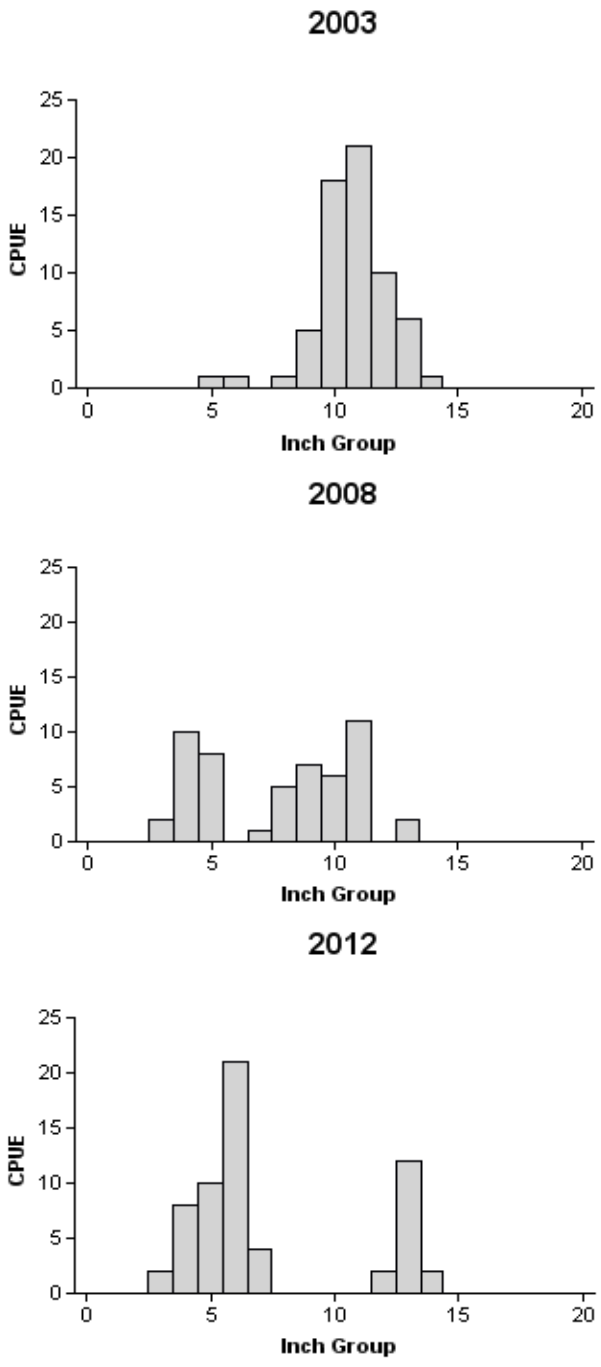


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Striker Reservoir, Texas, 2003, 2008, and 2012.

Bluegill

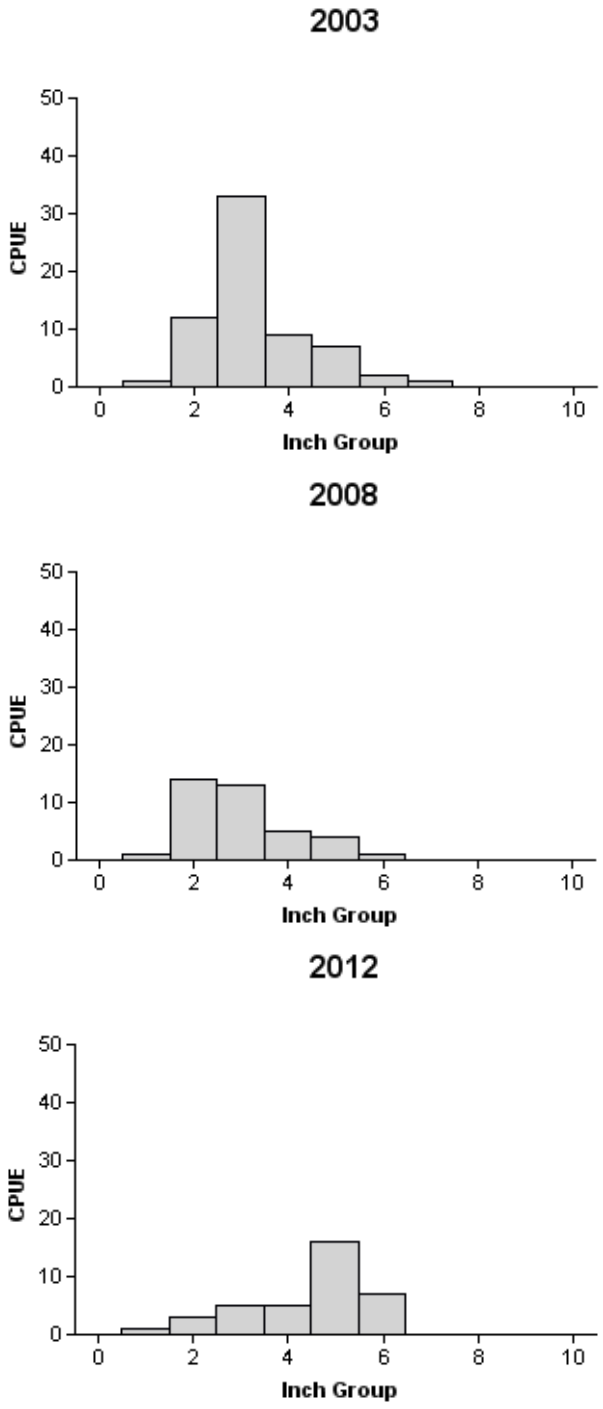
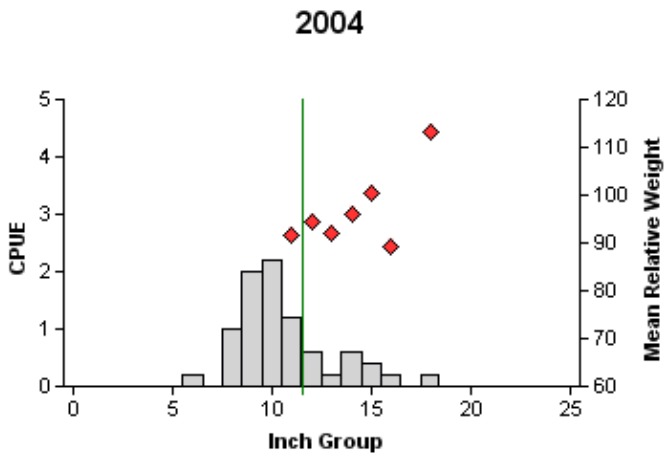
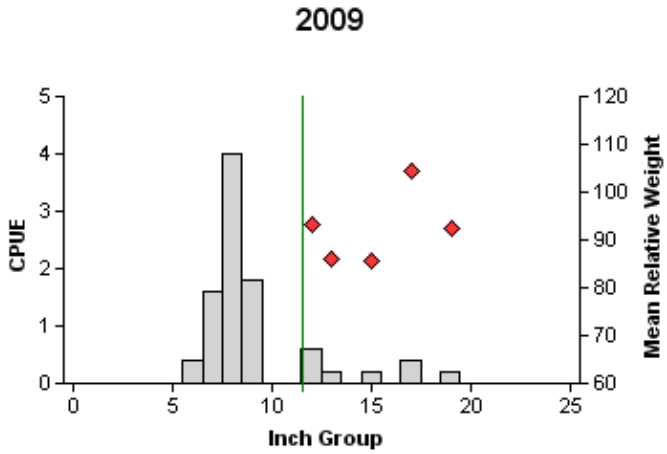


Figure 3. Number of Bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Striker Reservoir, Texas, 2003, 2008, and 2012.

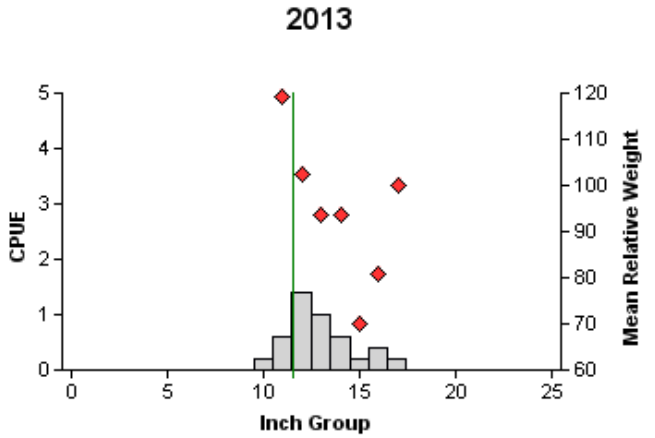
Channel Catfish



Effort = 5.0
Total CPUE = 8.8 (21; 44)
PSD = 12 (4.9)



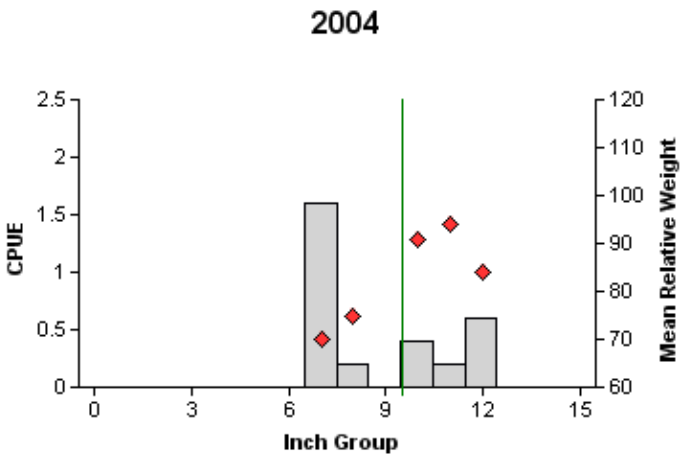
Effort = 5.0
Total CPUE = 9.4 (27; 47)
PSD = 38 (11.5)



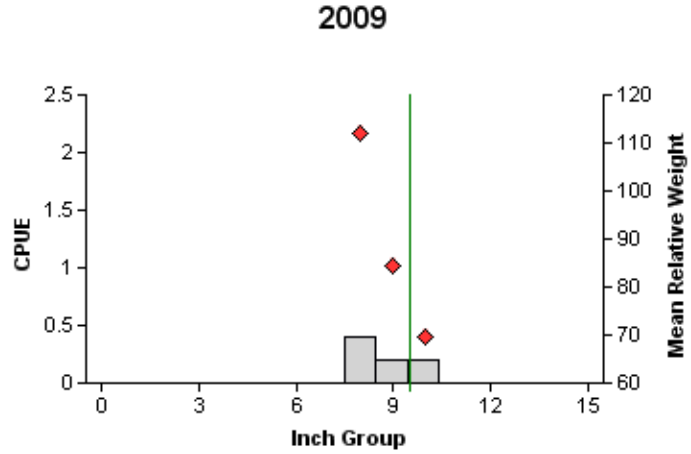
Effort = 5.0
Total CPUE = 4.6 (23; 23)
PSD = 14 (9.5)

Figure 4. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Striker Reservoir, Texas, 2004, 2009, and 2013. Vertical lines indicate minimum length limit.

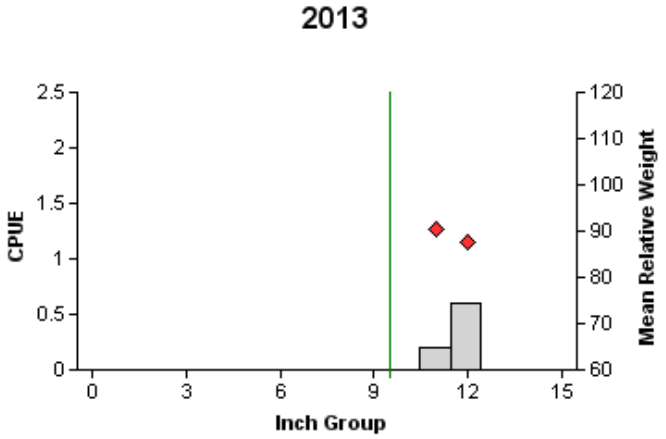
White Bass



Effort = 5.0
Total CPUE = 3.0 (69; 15)
PSD = 40 (12.8)



Effort = 5.0
Total CPUE = 0.8 (61; 4)
PSD = 50 (39.5)



Effort = 5.0
Total CPUE = 0.8 (73; 4)
PSD = 100 (0)

Figure 5. Number of White Bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Striker Reservoir, Texas, 2004, 2009, and 2013. Vertical lines indicate minimum length limit.

Spotted Bass

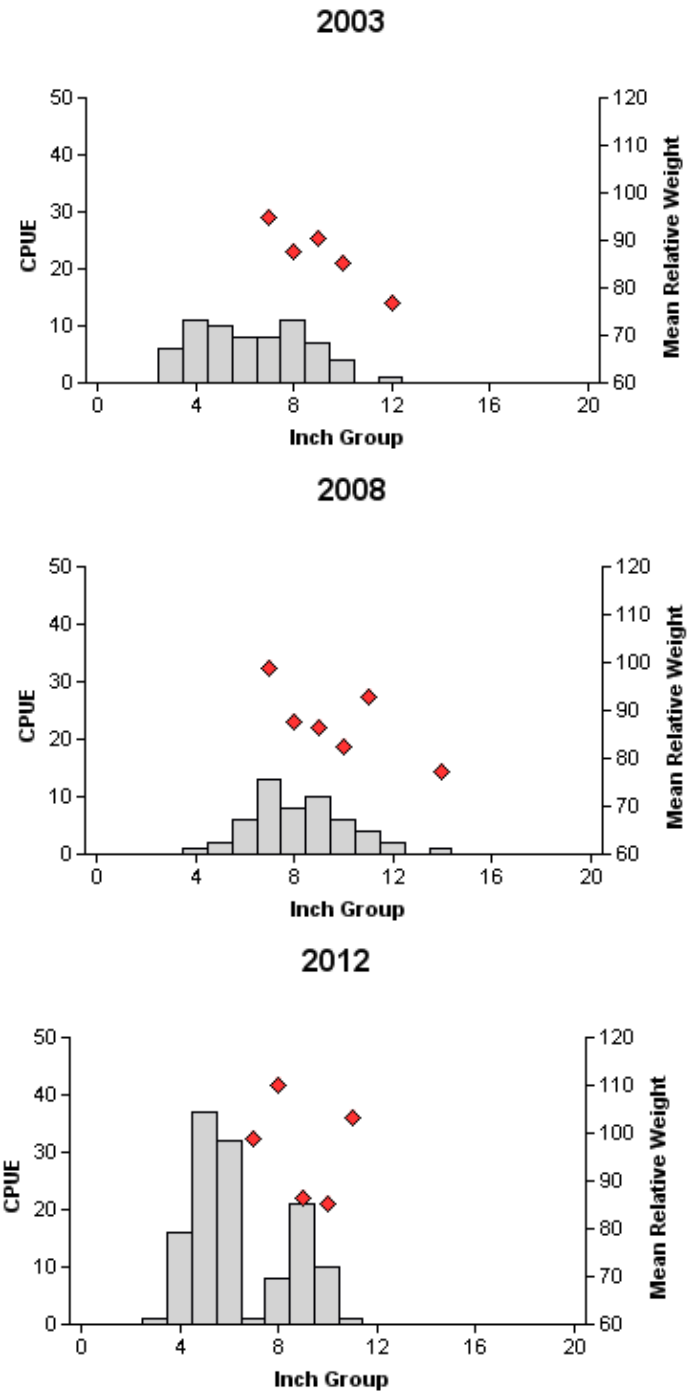


Figure 6. Number of Spotted Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Striker Reservoir, Texas, 2003, 2008, and 2012.

Largemouth Bass

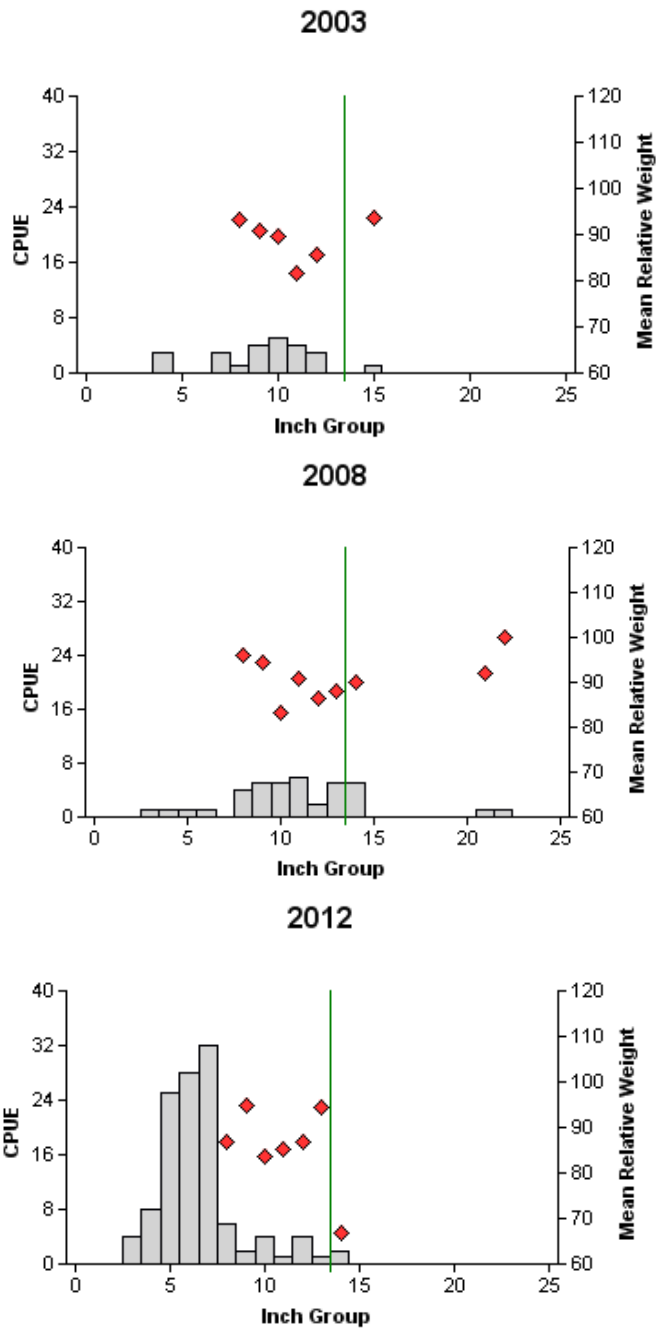


Figure 7. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Striker Reservoir, Texas, 2003, 2008, and 2012. Vertical lines indicate minimum length limit.

White Crappie

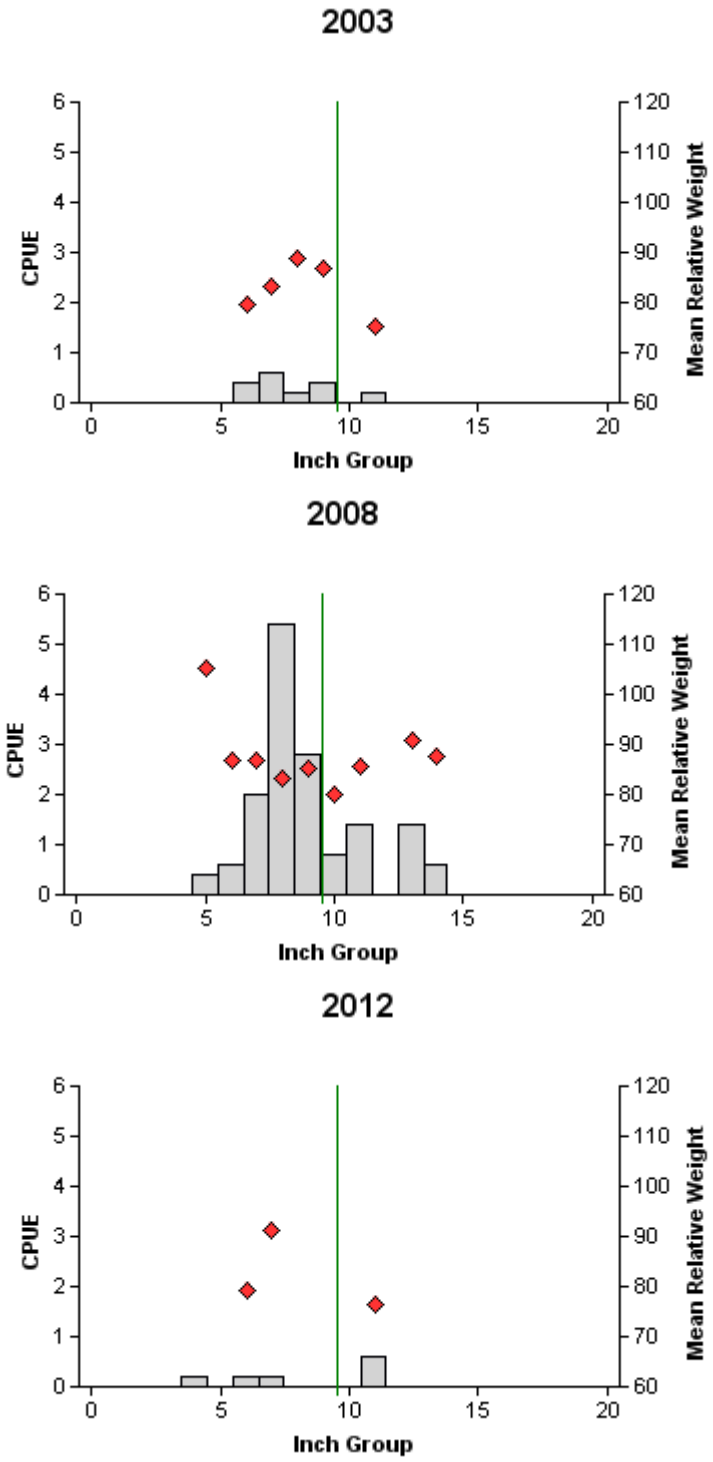


Figure 8. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Striker Reservoir, Texas, 2003, 2008, and 2012. Vertical lines indicate minimum length limit.

Table 7. Proposed sampling schedule for Striker Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in the winter, while standard electrofishing and trap net surveys are conducted in the fall. Standard survey denoted by S.

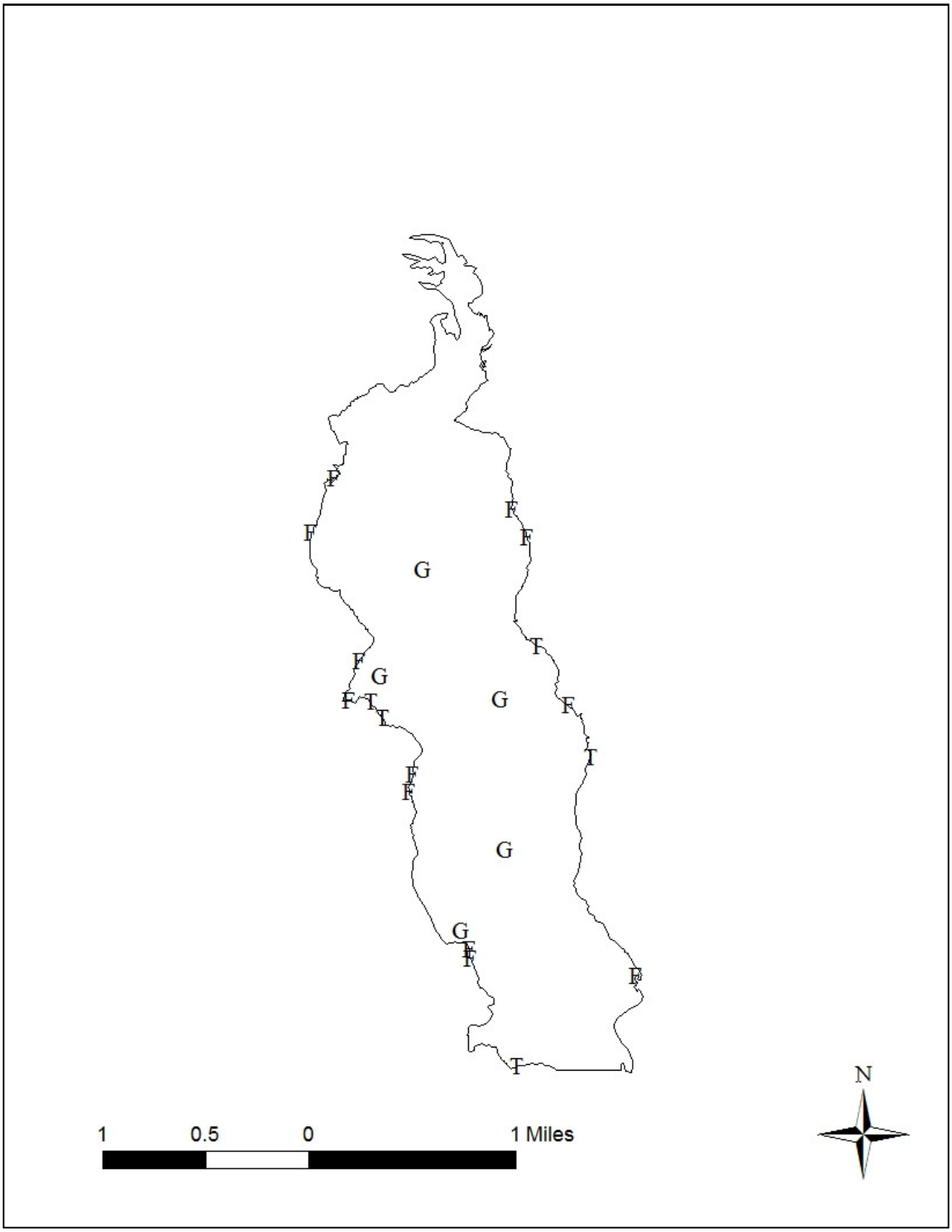
Survey Year	Electrofish	Gill net	Trap net	Access	Vegetation	Report
2013-2014						
2014-2015						
2015-2016						
2016-2017	S	S	A	S	S	S

Appendix A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Striker Reservoir, Texas, 2012-2013.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					61	61.0
Threadfin Shad					161	161.0
Channel Catfish	23	4.6				
White Bass	4	0.8				
Warmouth					9	9.0
Bluegill	1	0.2			37	37.0
Longear Sunfish	4	0.8			23	23.0
Redear Sunfish					21	21.0
Spotted Bass	1	0.2			127	127.0
Largemouth Bass	5	1.0			117	117.0
White Crappie	1	0.2	6	1.2		

Appendix B



Location of sampling sites, Striker Reservoir, Texas, 2012-2013. Trap net, gill net, and electrofishing stations are indicated by T, G, and F, respectively. Water level was near full pool at time of sampling.